

### FIGURE 1 DOCUMENT CORPUS

DOC1: Hello, my name is Fred.  
DOC2: Hello, my name is Scott.  
DOC3: Scott says, "Live and let live."

### FIGURE 2 DICTIONARY

1. name
2. fred
3. scott
4. Live

### FIGURE 3 DENSE MATRIX - INTEGER FORMAT (PRIOR ART)

1 1 0 0  
1 0 1 0  
0 0 1 2

(Space required:  
16 short ints at 2 bytes each = 32 bytes)

### FIGURE 4 DENSE MATRIX - FLOATING POINT NUMBER FORMAT (PRIOR ART)

0.707 0.707 0.0 0.0  
0.707 0.0 0.707 0.0  
0.0 0.0 0.447 0.894

(Space required:  
12 floats at 4 bytes each  
= 48 bytes)

(Note:  $0.707 = 1 * 1 / (1^2 + 1^2)^{1/2}$ ;  $0.447 = 1 * 1 / (1^2 + 2^2)^{1/2}$ ;  $0.894 = 2 * 1 / (1^2 + 2^2)^{1/2}$ )

### FIGURE 5 SPARSE MATRIX - FLOATING POINT NUMBER FORMAT (PRIOR ART)

(1 0.707) (2 0.707)  
(1 0.707) (3 0.707)  
(3 0.447) (4 0.894)

(Space required:  
6 short ints & 6 floats  
=  $6 * 2 + 6 * 4 =$  36 bytes)

**FIGURE 6 SMALL SPARSE MATRIX - FLOATING POINT NUMBER FORMAT**

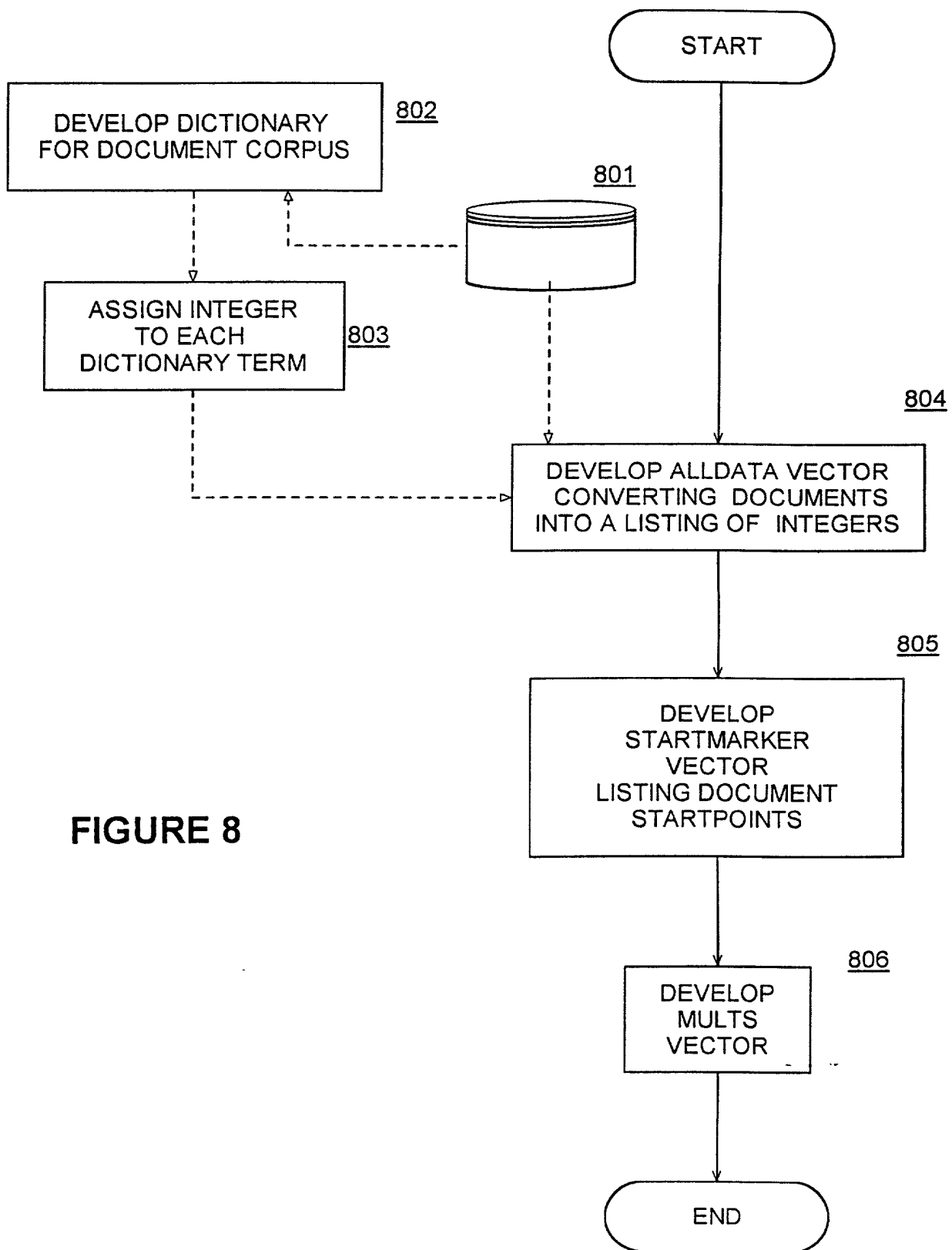
1, 2: 0.707  
1, 3: 0.707  
3,4,4: 0.447

(Space required:  
7 short ints & 3 floats  
=  $7*2 + 3*4 = 26$  bytes)

(Note:  $0.707 = 1/(1^2 + 1^2)^{1/2}$ ;  $0.447 = 1/(1^2 + 2^2)^{1/2}$ )

**FIGURE 7 SMALL SPARSE MATRIX IN VECTOR FORM**

ALLDATA = 1 2 1 3 3 4 4  
STARTMARKER = 1,3,5  
MULT = 0.707 0.707 0.447



**FIGURE 8**

FIGURE 9

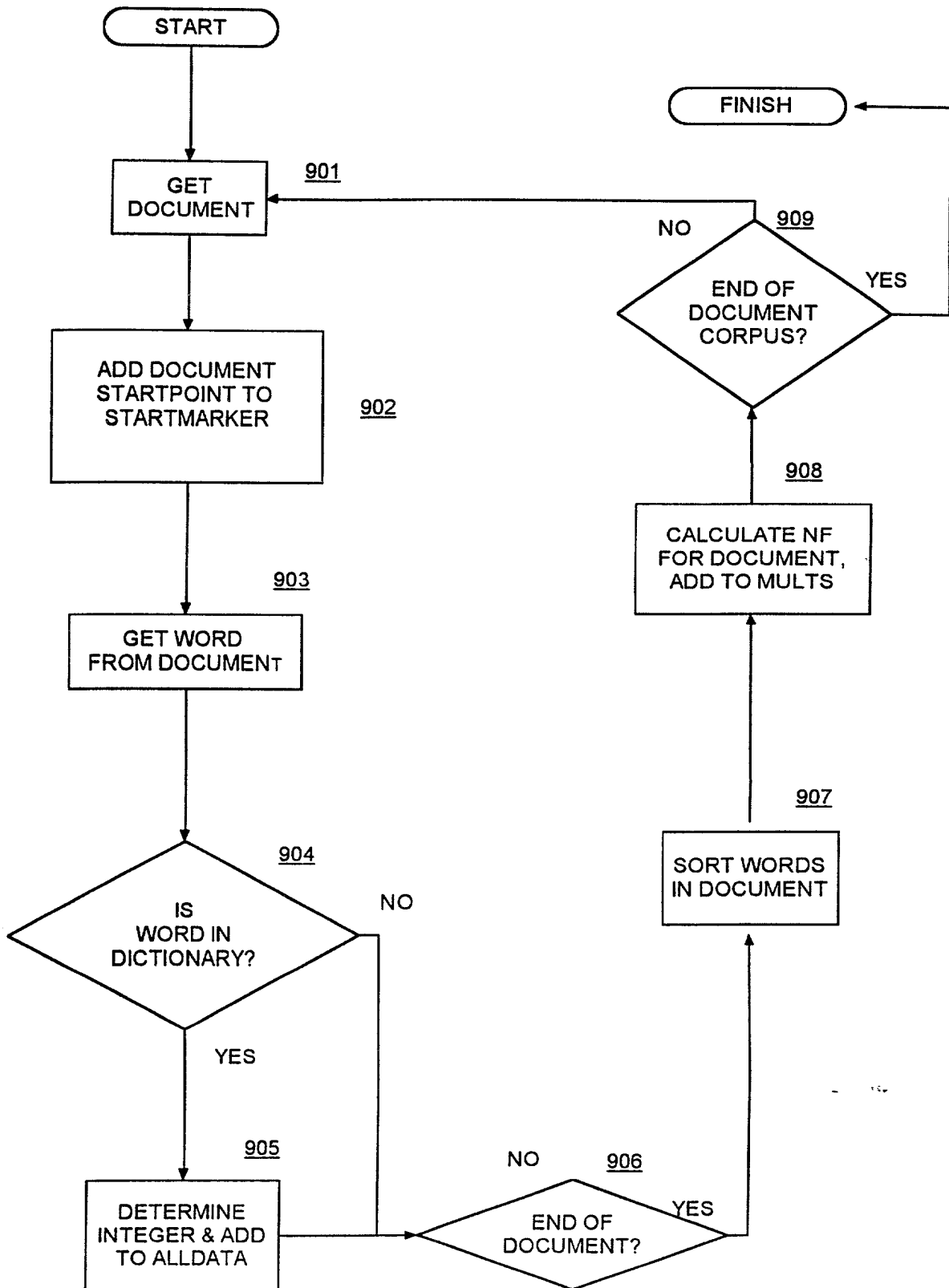


FIGURE 10

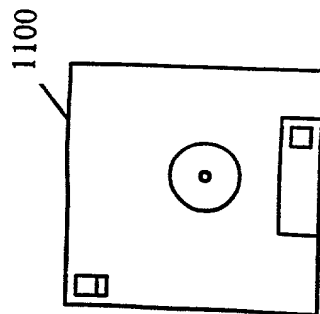
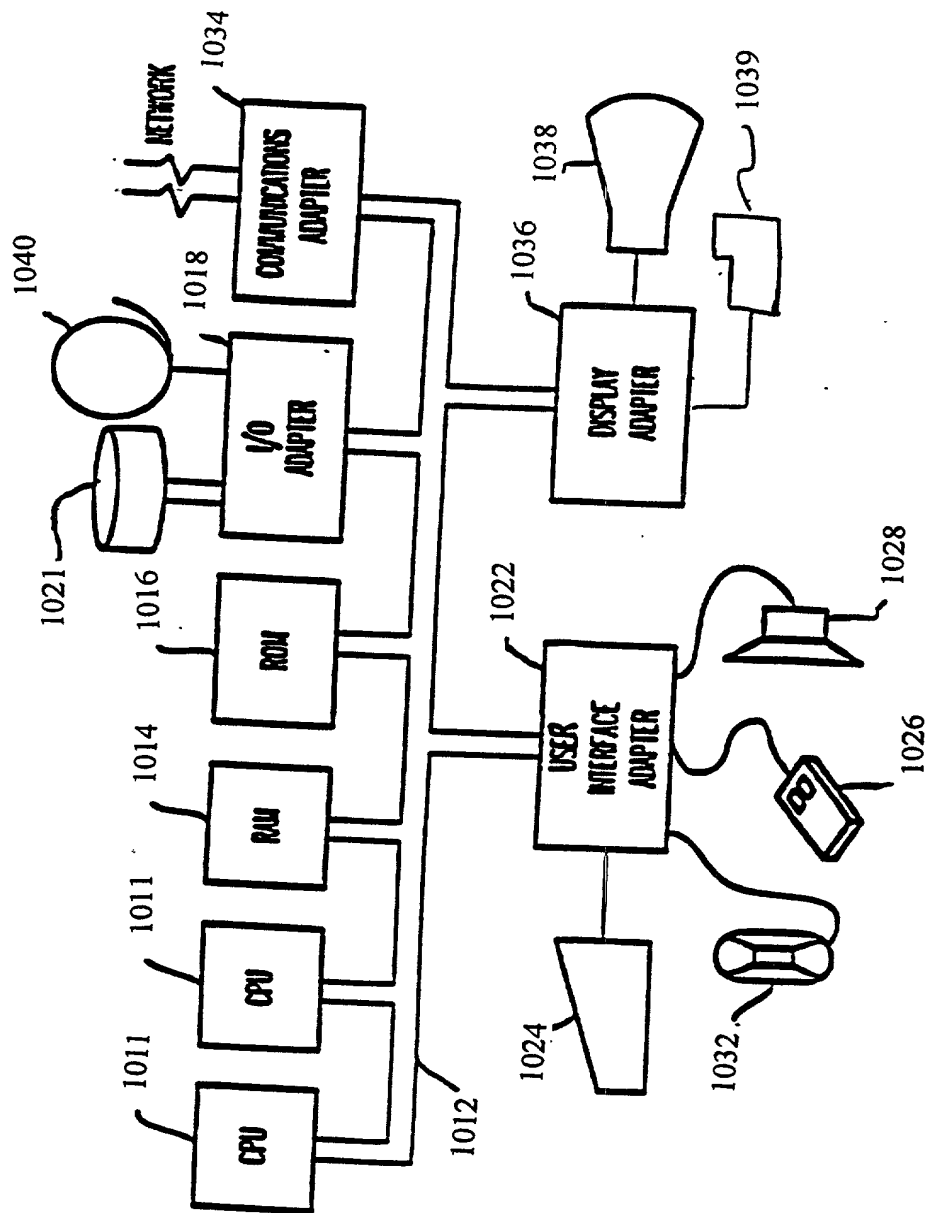


FIGURE 11